English Loanwords in Korean*

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1. Introduction

In this paper, I will examine the difference between English language source forms and their borrowed forms (loanwords) in Korean. Particularly, I will examine loanwords which are borrowed directly from the source language, not those which are borrowed through Japan.

While examining English loanwords in Cantonese, Yip (1993) argues that Cantonese loanword phonology does not constitute a separate component of the grammar and that the differences between English language source forms and their Cantonese equivalents are the result of subjecting non-native inputs to the well-defined constraints of Cantonese native vocabulary phonology. Her analysis is done within optimality theory.

In this paper, I will argue that loanword phonology in Korean should exist as a separate component of the grammar unlike Cantonese loanword phonology: I will show that Korean loanword phonology and Korean native vocabulary phonology have separate constraint systems within optimality theory.

In section 2, I examine Korean syllable structure and some relevant phonological rules. Section 3 outlines Steriade's (1991) suggestion about stop closure and stop release. Section 4 outlines some basic concepts of optimality theory. Section 5 discusses the data and proposes the analysis.

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2. Korean Syllable Structure

In this section, I briefly discuss Korean syllable structure. The purpose for the discussion of Korean phonology is based on the assumption that when a foreign word is adopted into another language, it attempts to conform to the native phonology of a language. The consonant inventory of Korean is given in (1).

(1)		labial	coronal	velar	glottal
stop					
	asp.	ph	th	kh	
	plain	p	t	k	
	cons.	p′	t′	k′	
affricate					
	asp.		ch		
	plain		c		
	cons.		c′		
fri.	plain		s		h
	cons.		s′		
nasal		m	n	ŋ	
lat			l		

The Korean syllable structure is maximally CGVC. Any consonant except [ŋ] and [l] can appear as an onset whereas only one of [p, t, k, m, n, ŋ, l] can appear as a coda. Some examples ending with a possible coda are given in (2)[1].

(2)	U.R.	stem+in	stem+kwa	stem alone
	a) pap	.pa.pin.	.pap.kwa.	.pap.
	b) tam	.ta.min.	.tam.kwa.	.tam.
	c) s′al	.s′a.rin.[2]	.s′al.kwa.	.s′al.

[1] A dot represents a syllable boundary.
[2] An intervocalic [l] appears as [r].

If a segment which is not one of the licensed coda consonants is syllabified as a coda, it is modified to become one of the possible codas. Some examples are given in (3).

(3)	U.R.	stem + in	stem + kwa	stem alone
	a) path	.pa.thin.	.pat.kwa.	.pat.
	b) k'och	.k'o.chin.	.k'ot.kwa.	.k'ot.
	c) os	.o.sin.	.ot.kwa.	.ot.
	d) pak'	.pa.k'in.	.pak.kwa.	.pak.

As we can see in (3), if an unlicensed segment is syllabified as a coda, i.e. an aspirated stop (3a), an affricate (3b), a fricative (3c), and a constricted consonant (3d), it changes into a plain stop with the same (or the similar) place features. Korean syllable structures, then, have the following constraints.

(4) Onset Conditions: Only one consonant is allowed for an onset unless it is followed by a glide. [ŋ] and [l] cannot be onsets.

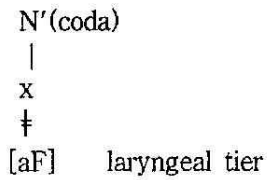
a. *σ[C b. *σ[C c. *σ[CC
| | |
[ŋ] [l] [+cons]

(5) Coda Conditions in Korean

a. obstruent b. sonorant
VC] VC]
| |
[-cons, -son] [+cons, +son]
[-const, -asp]

If a segment which does not obey Coda Conditions is syllabified as a coda, a rule (6) applies to modify its features.

(6) Neutralization (Sohn 1987)

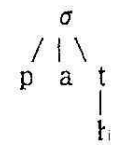


A sample derivation within the process-oriented phonology is given in (7).

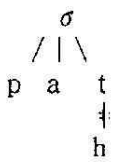
(7)

U.R. /path/

a. syllabification--------



b. neutralization (6)--------



S.R. [pat]

3. Aperture Feature

Steriade (1991) observes that notions like stop closure and stop release play an important role in phonology as were previously noted by McCawley(1967), Kim-Renaud (1974, 1986), and Selkirk (1982). Noting the similarity between the release of a stop and the aperture position of an approximant or a fricative, she proposes three general aperture positions into phonology, namely Ao, A_f and Amax in (8).

(8) Closure (Ao) = total absence of oral airflow

Fricative (A_f) = degree of oral aperture sufficient to produce a turbulent air stream

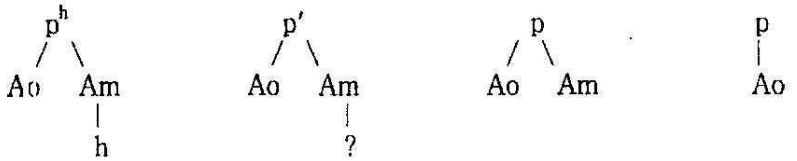
Approximant (A_{max}) = degree of oral aperture insufficient to produce a turbulent airflow

Steriade (1991) shows that we obtain representations like (9) for stops, fricatives and approximants using the aperture positions in (8).

(9) a) plain, released stop = Ao Amax
b) unreleased stop = Ao
c) fricative = A_f
d) affricate = Ao A_f

Depending on how it is pronounced, /p/ can be represented in several ways in (10).

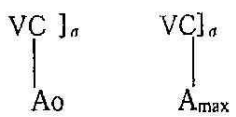
(10) a. aspirated [p^h] b. constricted [p'] c. released [p] d. unreleased [p]



As is shown in (5), Korean allows only [p,t,k,m,n,ŋ,l] for codas. With aperture features, then, Coda conditions (5) can be rewritten as (11).

(11) Coda Conditions in Korean

a. stops b. approximants



Either unreleased stops or consonantal approximants can appear as coda.

4. Optimality Theory

In this section, I outline Optimality theory (McCarthy and Prince 1993, Prince and Smolensky 1993, etc.) which we will extensively use in the analysis of English loanwords in Korean.

Optimality theory says that there exist no phonological rules but only phonotactic constraints in phonology. In addition, it says that there are no intermediate representations of the derivation in phonology. Rather, a function Gen produces all the possible candidates for an input and the best output out of the candidates is selected by a function Eval which is given by the system of output constraints.

(12) Gen(in) -----> {cand1, cand2, ...)
Eval {cand1, cand2, ...} = out_{real}

Output phonotactic constraints are ranked with each other. If constraint A has priority over Constraint B, it is said that 'A dominates B'. In a 'constraint tableau' which displays the hierarchy of constraints, a constraint on the left side dominates a constraint on the right side. If two candidates satisfy only one of two phonotactic constraints A, B as is shown in (13), the candidate which satisfies the more highly ranked constraint is chosen for an output.

(13)

candidates	A	B
√ cand1		*
cand2	*!	

Some remarks are due for a constraint tableau in (13). ! indicates a fatal violation. A candidate with a ! sign loses to other more promising candidates. A symbol √ represents the optimal candidate.

Several phonotactic constraints are relevant for our discussion of Korean phonology. One important phonotactic constraint is coda conditions (11) in Korean which is rewritten here as (14).

(14) Coda Conditions in Korean

a. stops b. approximants

VC]$_\sigma$ VC]$_\sigma$

| |

Ao A_{max}

In addition, some other universal phonotactic constraints are relevant for our discussion on Korean syllable structure. Let us first discuss faithfulness constraints (cf. McCarthy and Prince 1993, etc.). One of them is Parse(input) which says whatever is in the input, it should be syllabified.

(15) $Parse^{Seg}$: Parse segments.

In the following representations, for example, (16a) does not violate $Parse^{Seg}$ whereas (16b) violates $Parse^{Seg}$ twice; all segments are parsed in (16a) whereas two segments are not in (16b).

(16)

a. σ b. σ

/ | \ \ / |

C V C C C V C C

Another relevant constraint of Parse(input) is $Parse^{feat}$

(17) $Parse^{feat}$: Features should be associated to a root node.

For instance, in the following representations (18a) does not violate $Parse^{feat}$ whereas (18b) violates the constraint $Parse^{feat}$. More specifically, (18b) violates $Parse^{Am}$.

(18)

Input ----------

C V C

/ \

Ao Am

Output --------

a. b.

C V C C V C

/ \ /

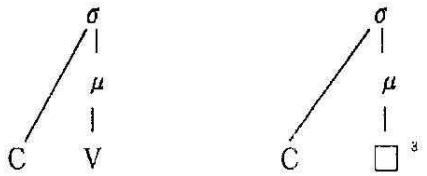
Ao Am Ao Am

Another member of faithfulness constraints is Fill which says that a prosodic position should be filled with phonetic material. One member of Fill constraints is $Fill^{nuc}$ in (19).

(19) $Fill^{nuc}$: a nucleus node should be filled.

(19a) satisfies $Fill^{nuc}$ whereas (19b) violates $Fill^{nuc}$.

(19) a. b.



Other phonotactic constraints which become relevant for Korean syllable structure include NoCoda.

(20) NoCoda: Syllables are open.

NoCoda corresponds to the markedness observation which says that open syllables are less marked than closed syllables.

Now, let us consider the tentative constraint tableau in (21) for Korean native vocabulary. In the following constraint tableau, segments (or features) inside of the angled brackets < >, are unparsed ones.

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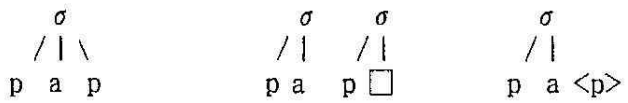
[3] An empty box will be filled with a default vowel.
We will interchangeably use □ with Korean default vowel [ɨ].

(21) Input: /pap/

cand.	Coda C.	Fill^{nuc}	Parse^{Seg}	Parse^{Am}	NoCoda
√ a. .pap.					*
b. .pa.p□.		*!			
c. .pa.<p>			*!		

The autosegmental representations for each candidate are given in (22).

(22) a. .pap. b. .pa. p□. c. .pa. <p>



Among the candidates given in (21), /pap/ in (21a) is the best output since it violates only NoCoda constraint which is ranked lowest in the constraint tableau in (21). Other candidates violate some other constraints which are ranked higher than NoCoda.

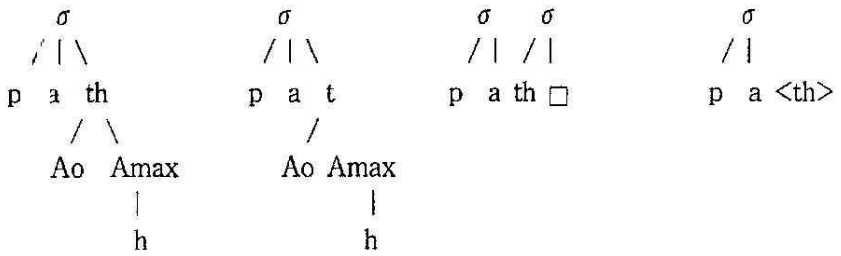
Let us consider another example, /path/ in (23). It surfaces as /pat/ if no affix is added.

(23) Input: /path/

Cand.	Coda C.	Fill^{nuc}	Parse^{Seg}	Parse^{Am}	NoCoda
a. .path	*!				*
√ b. .pat.<h>				*	*
c. .pa.th□.		*!			
d. .pa.<th>			*!		

The autosegmental representations for each candidate in (23) are given in (24).

(24) a. .path. b. .pat. c. .pa.th□. d. pa<th>



Among the possible candidates for an input /path/, /pat/ in (23b) is the best possible candidate which violates $Parse^{Am}$ and NoCoda. Other candidates violate constraints which are higher than $Parse^{Am}$ and NoCoda.

5. English loanwords in Korean

In this section, we will analyze loanwords in Korean based on the theoretical assumptions introduced in the earlier sections.

Korean recently borrowed many words from other languages. These words are borrowed with no change from the source language forms if they can be properly syllabified in Korean. Some examples are given in (25).

(25)	English	Korean
	pepsi	phepsi
	necktie	nekthai

Many English words, however, have some sounds which do not exist in the Korean sound inventory. For example, voiced sounds such as [b,d,g] do not exist in Korean. Therefore, when words with these sounds are borrowed, some changes occur to make them conform to Korean phonological system. Let us discuss then what changes occur in what fashion when words are borrowed from other languages. We will mostly focus

on loanwords from English.

While working on loanwords in Cantonese, Silverman (1992) has faced the problem we mentioned; namely, that English words which contain no matching sound matrices in Cantonese or have different prosodic structure from Cantonese are borrowed. To solve the problem, Silverman (1992) proposes two different phonological levels for loanwords; the perceptual level and the operative level. In the perceptual level, Silverman (1992) argues that input signal is parsed into segment-sized chunks and that they are provided with native matrices which are as close as those sounds in articulatory and/or acoustic properties. In the operative level, Silverman (1992) argues that native phonotactic constraints apply to raw segmental material so that it can be realised following the native prosodic constraints such as syllable structures.

Following Silverman (1992), I assume that sounds of borrowed words which do not exist in Korean sound inventory will be matched with native sounds which are as close as original sounds. For example, in Korean voicing is not contrastive whereas aspiration is. Therefore, two sets of sound in English, [p, t, k, tʃ] and [b, d, g, dʒ] with voicing difference will be matched with two sets of sound with similar phonetic properties in Korean, namely [ph, th, kh, ch] and [p, t, k, c] distinguished from each other by aspiration: voiceless aspirated segments in English are realised as strongly aspirated consonants and voiced unaspirated segments as slightly aspirated consonants in Korean. By being matched with differnet sets of phonemes, the distinctiveness in the source language forms is maintained. Examples are given in (26).

(26)	English	perceptual level
	game	keim (k'eim)[4]
	key	khi
	jeep	ciphi
	chase cult	cheisi khalthi

Not only pronunciation, but spelling of the words in the source language affects the pronunciation of loanwords (cf. Silverman 1992). [p, t, k] after [s] which are not aspirated in English appear as aspirated in loanwords.

[4] Some English words with an initial voiced sound are borrowed as words with a constricted sound.

(27)	English	Korean
	style	sithail
	spy	siphai

I assume that spelling, rather than the pronunciation of the source language, has affected the pronunciation of the borrowed words in (27).

Unlike words (26) whose sound matches are done in the perceptual level, there are loanwords which should undergo some phonological changes in conformity with prosodic constraints of Korean. Following Silverman (1992), I assume that these changes occur at the operative level of phonology. Some examples are given in (28). [i] is an inserted default vowel.

(28)	English	perceptual	level operative level
a)	stress	sthres	sithiresi
b)	beef	pif	pifi

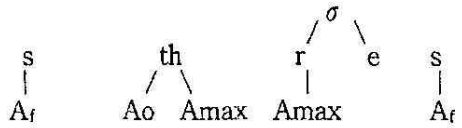
In (28a) a monosyllabic word 'stress' is adopted as a four syllable word in Korean. Following Silverman (1992), I suggest that [sithiresi] has undergone different processes in each phonological level of loanwords. In the perceptual level, 'stress' is matched with native sound matrices /sthres/ in Korean which contains four released consonants as is shown in (29a). In the operative level, phonological processes occur to /sthres/ and make it to conform to the phonotactic constraints of Korean. Since released consonants can be realized only as onsets, not as codas in Korean, only /r/ followed by a vowel is syllabified as an onset as is shown in (29b). Other released consonants are syllabified as onsets with the help of inserted vowels. (29) shows the phonological derivation of /sithiresi/ within process-oriented phonology.

(29)

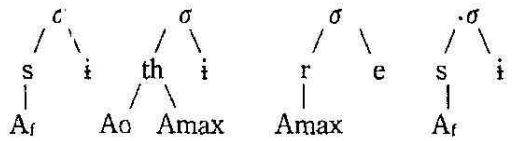
a. perceptive level ----------

s	th	r	e	s
|	/ \	|		|
A_f	Ao Amax	Amax		A_f

b. syllabification ----------



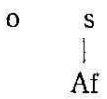
c. default vowel insertion ----------



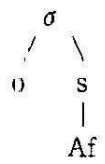
Compare the way loanwords are syllabified with that of Korean native vocabulary. In particular, compare (28a) and (29) with (3c) which is rewritten as (30) for convenience. The representation is given in (31).

(30)	U.R.	stem+in	stem
	os	.o.sin.	.ot.

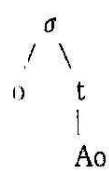
(31) a. Underlying representation----------



b. syllabification ----------



c. neutralization (6)----------



In (31b), a released consonant [s] is syllabified as a coda, which then undergoes neutralization, becoming [t]. Compare it with (29b). In (29b), the final [s] is not syllabified as a coda of the syllable /re/ since it is a released consonant. If the same syllabification rule which has applied in (31) has applied to (29), the final [s] should be syllabified as a coda of the syllable /re/, becoming [ret] by neutralization.

Intuitively, it seems that the final [s] in /sthres/ is not syllabified as a coda of the syllable /re/ because the original sounds of the source form tend to be preserved when words are borrowed if possible. If [s] is syllabified as a coda, then it should undergo the neutralization and become a different sound [t]. Therefore, the final /s/ in /sthres/ is not syllabified as a coda. In Korean native phonology, however, there is no such tendency to preserve the underlying feature of a segment in the same environment.

This intuition can be implemented into the Optimality Theory by ranking the constraints 'Parse^{seg}' and 'Parse^{feat}' higher than 'Fill^{nuc}' in the constraint tableau of loanwords. It is given in (32).

(32) Constraint Tableau for English Loanwords in Korean

Input: /sthres/

candidates	coda cond.	Parse^{Seg}	Parse$^{Am,\ Af}$	Fill^{nuc}	NoCoda
√ a. .si.thi.re.si.				***	
b. .sit.re.si.			*!	**	*
c. .si.thi.ret.			*!	**	*
d. .si.thi.res.	*!			**	*

Among the possible candidates for 'stress', /sithiresi/ violates Fill^{nuc} three times but other candidates given in (32) violate a constraint which is ranked higher than Fill^{nuc}, namely Parse$^{Am,\ Af}$ or CodaCondition. Therefore, /sithiresi/ is selected as the best output for the input /sthres/.

Note that the constraint ranking of loanwords in (32) is different from that of native vocabulary given in (21): the constraints Parse^{Am}, Parse^{Af} is placed higher than Fill^{nuc} in (32) but the ordering is reversed in the constraint tableau of native vocabulary. (23) is rewritten as (33) for convenience.

(33) Constraint Tableau for Korean

Input: /path/

Cand.	coda C.	Fill^{nuc}	Parse^{Seg}	Parse$^{Am,\ Af}$	NoCoda
a. .path.	*!				*
√ b. .pat.<th>				*	*
c. .pa.thi.		*!			
d. .pa.<th>			*!		

Yip (1993) argues that "Loanword phonology in Cantonese does not exist as a separate component of the grammar and that the difference between English language source forms and their Cantonese equivalents can be understood as the result of *subjecting non-native inputs to the constraints that define well-formed Cantonese words* (emphasized by HSK)." Yip's (1993) observation, however, cannot apply to loanwords in Korean. As is shown in (32) and (33), non-native inputs are not subjected to the same ordering of constraints that define well-formed Korean words.

Segments which are not released in the source language are perceived as unreleased in loanwords as well and thus in the right environment will be syllabified as codas. Some examples are given in (34).

(34)	English	Korean
a. pepsi	[pepsi]	[phepsi]
b. necktie	[nektai]	[nekthai]

Second /p/ in 'pepsi' and /k/ in 'necktie' are unreleased in English language source forms. The representation of 'pepsi' can be represented as (35) with aperture positions.

(35) The representation of /pepsi/ with aperture features

```
   ph  e   p    s    i
  /  \     |    |
Ao   Am   Ao   Af
```

Since a stop with Ao feature can be syllabified as a coda in Korean, second /p/ will be syllabified as a coda in /pepsi/. The constraint tableau for 'pepsi' is given in (36).

(36)

candidates.	coda Cond.	$Parse^{feat}$	$Fill^{nuc}$	$*Ins^{Am}$	NoCoda
√ a. .phep.si.					*
b. .phe.phi.si.			*!	*	

Of the possible candidates, /phepsi/ violates only NoCoda whereas /phephisi/ violates $Fill^{nuc}$ and $*Ins^{Am}$ which are ranked higher than NoCoda.

Words with a final consonant cluster are pronounced as in (37).

(37)

English	Korean
a. camp	cæmphi
b. print	phirinthi
c. post	posithi

Even though the final obstruent in the word final coda cluster is often unheardable in English, it is always realised when borrowed into Korean. I assume that examples in (37) are another cases where the spelling affects the pronunciation of loanwords. Therefore, I assume that the word-final consonant in a consonant cluster is pronounced as released after another consonant by rule (38). This rule is not a phonological rule but a rule which translates an input form from the source language into an equivalent form in the adopting language based on the spelling.

(38) C ----> [+released] / C _____ ##

Therefore, the forms which enter the operative level of loanword phonology are those in (39).

(39) forms entering the operative level

a. camp [cæmph]

b. print [phrinth]

c. post [posth]

When an input /phrinth/ is subjected to phonotactic constraints of loanword phonology, the following tableau is produced.

(40) input: /phrinth/

candidates	coda cond.	$Parse^{Seg}$	$Parse^{Am,\ Af}$	$Fill^{nuc}$	NoCoda
√ a. .phi.rin.thi.				**	*
b. .phi.ri.it<h>.			*!	**	**
c. .phi.rin.<th>		*!		*	*

Among the possible candidates, (40a) is the best output violating the lowest constraints.

A phonological process such as nasal spreading in Korean also affects the pronunciation of English loanwords. Let us consider 'acting' and 'picnic' in English.

(41)	English	Korean
a. acting	[æktiŋ]	[æktiŋ]
b. picnic	[piknik]	[phikhinik]

In (41a) /k/ is syllabified as a coda of the first syllable when borrowed into Korean. This is due to the fact that /k/ in [æktiŋ] is unreleased in the source language (cf. 34). However, in (41b) the first /k/ in [piknik] is not syllabified as a coda of the first syllable even though it is unreleased in the source language. Rather, an output with an inserted vowel after the first [k] surfaces.

I would like to suggest that this is due to nasal feature spreading in Korean. Nasal spreading rule changes an obstruent into a nasal when it is followed by a nasal. Nasal spreading rule is an obligatory rule in Korean as is shown in (42).

(42)	Stem	Stem+ko	Stem+nin
	tat	tatko	tannin
	top	topko	tomnin

The obligatory nasal spreading rule can be subsumed under the constraint Sonority Condition. Sonority Condition (Hooper 1976, Vennamann 1988, etc.) says that the

sonority level of a coda consonant is not lower than that of an onset consonant. I suggest a constraint tableau in (43).

(43)

candis	coda cond.	Son. Cons.	$Parse^{Seg}$	$Parse^{[-son]}$	$Fill^{nuc}$	$*Ins^{Am}$
√ a. .phi.khi.nik.					*	*
b. .phik.nik.		*!				
c. .phiŋ.nik				*!		

Among the candidates, /phikhinik/ which violates $Fill^{nuc}$ and $*Ins^{Am}$ is the optimal output. Other candidates violate other constraints which dominate $Fill^{nuc}$. For example, /phiknik/ in (43b) violates sonority condition and /phiŋnik/ violates $Parse^{[-son]}$ as well as other constraints like $*Insert^{nas}$ as is shown in (44). (44) is the autosegmental representation of the output of [phiŋnik] from the input /phiknik/: [-son] feature which was previously associated with /k/ is dissociated from the segment.

(44) ph i ɾ n i k
C V C C V C
:: \ |
[-son] [+nasal]

Among speakers of younger generations, however, there are some variations in the pronunciation of words with the similar phonological environment. Consider (45).

(45) pronunciations of younger generations

a. picnic	phiŋnik	*phikhinik
b. big mac	piŋmæk	*pikimæk
c. pacman	phæŋmæn	*phækimæn

In order to explain the pronunciations of younger generation, we need to have different constraint ranking in (46), rather than that in (43). For speakers of younger generation, $Fill^{nuc}$ should be ranked higher than $Parse^{[-son]}$. Therefore, /piŋ^{mæk}/ which

violates Parse$^{[-son]}$ is selected as the best output.

(46)

canc.	Coda C.	Son. Con.	Parse^{Seg}	Fill^{nuc}	Parse$^{[-son]}$	*Ins^{Am}
a. .pik.mæk.		*!				
√ b. .piŋ.mæk.					*	
c. .pi.ki.mæk.				*!		*

Another interesting thing occurs when the last consonant of a word final cluster is a sonorant. Some examples are given in (47).

(47)	English	perceptual level	operative level
a)	film	philm	phillim
b)	prism	phricm	phiricim

In (47a) the final [m] is not syllabified with an underlying vowel: the coda position of an underlying vowel is filled with [l]. [m] is, rather, syllabified as a coda of an inserted vowel. Similarly, [m] in (47b) is syllabified as a coda of an inserted vowel /cim/$_{a}$.

Compare these with the last obstruent of a word final cluster in (37). For example, [th] in /phrinth/ which cannot be syllabified with an existing vowel, gets syllabified as an onset of a new syllable, not as a coda. What, then, forces obstruents in (37) to be syllabified as an onset and sonorants in (47) as codas?

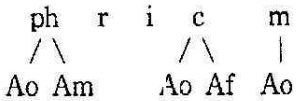
I have argued earlier that the last obstruent of a word final cluster is syllabified as an onset because it is released: A released stop can be syllabified only as an onset in the Korean loanword phonology. Following Steriade (1991), I have argued that Amax feature of a released obstruent (AoAmax) forces it to be syllabified as an onset. If a stop has only Ao feature like a second /p/ in 'pepsi', it is syllabified as a coda even in the loanword phonology.

The same representation can be used for nasals. [m] in (47) is pronounced with unreleased oral airflow in the source language. At the perceptual level, it should be represented as (48a). Within the process-oriented phonology, it will undergo the

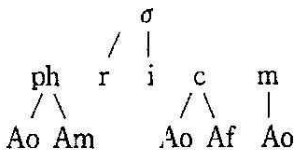
processes in (48b, c). Again, note that an unreleased consonant is syllabified as a coda.

(48) 'prism'

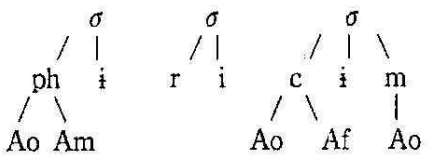
a. perceptual level



b. syllabification----------



c. Insertion of a default vowel---------



Within optimality theory, the constraint tableau we adopted will produce the right output form.

(49)

candidates	coda cond.	Parse^{feat}	Fill^{nuc}	*Ins^{Am}	NoCoda
√ a. .phi.ri.cim.			**		*
b. .phi.ri.ci.mi			***!	*	

If the word-final sonorant is released in the source language, a different output form will be produced. Let us consider a loanword from French. French releases all the final consonants, contra to English. 'Comme' in French is pronounced with the final [m] released. When a French word 'comme' is borrowed into Korean, it is pronounced as

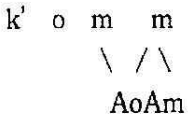
[k'ommi], not [k'om] as in (50). Why is a mono-syllabic French word [kom] borrowed as a disyllabic word even if Korean allows the coda sonorant?

(50)	French	Korean
comme toi	[kom twa]	[k'ommi t'ɨwa]

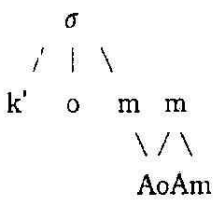
I argue that this is due to the fact that the final sonorant in French is released. The representation of 'comme' in the perceptual level is (51a). Within process-oriented phonology, the following phonological processes will occur.

(51) input 'comme'

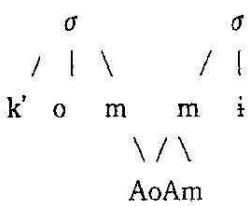
a. perceptual level[5] ----------



b. syllabification----------



c. Insertion of a default vowel---------



Since the final [m] contains Amax aperture position, it should be realized as an onset. Within Optimality theory, the constraint tableau in (52) gives us the right output.

[5] An [m] with AoAm feature at the word final position is perceived as a geminate in Korean.

(52)

candidates	coda cond.	Parse^{Am}	Fill^{nuc}	*Ins^{Am}	NoCoda
√ a. .k'om.mi.			*		*
b. k'om		*!			*

Some loanwords have two different pronunciations as shown in (53). Both pronunciations are accepted but younger generations tend to adopt the pronunciation in (ii), rather than (i).

(53) English Korean

a. cut	i) khəthi	ii) khət
b. pot	i) phothi	ii) phot
c. cook	i) ʔkhuki	ii) khuk

One thing to note about examples in (53) is that if the final consonant is other than [t], the surface form with an inserted [i] is not so preferred. As is shown in (53c), /khukhi/ is not a well-received form for both old generation and young generation. The constraint tableau we have adopted so far explains why /khukhi/ is not an optimal form.

(54)

candidates	coda cond.	Parse^{Am}	Fill^{nuc}	*Ins^{Am}	NoCoda
√ a. .khuk.					*
b. .khu.khi.			*!	*	

Why then are there two pronunciations for English words with the final /t/ in (53)? Note that no noun ends with /t/ in Korean. In addition, if a noun with the final /t/, let's say, /khət/, is borrowed and placed before a vowel-initial suffix, it will be pronounced with the final /s/ as is shown in (55).

(55)	English	Korean	+nominalizer
	cut	i) khəthɨ	khəthɨ + ka
		ii) khət	khəs + i

I suggest different constraint rankings for different pronunciations. Speakers who pronounce /khəthɨ/ rather than /khət/ has the constraint tableau in which a constraint $*Vt]_{noun}$ is placed higher than $Fill^{nuc}$ $*Vt]_{noun}$ prevents a noun-final consonant from being [t].

(56)

candidates	coda cond.	$*Vt]_{noun}$	$Fill^{nuc}$	$*Ins^{Am}$	NoCoda
√ a. .khə.thɨ.			*	*	
b. .khət.		*!			*

Speakers who pronounce /khət/ instead of /khəthɨ/ have the constraint tableau (57) in which $Fill^{nuc}$ is ranked higher than $*Vt]_{noun}$.

(57)

candidates	coda cond.	$Fill^{nuc}$	$*Vt]_{noun}$	$*Ins^{Am}$	NoCoda
a. .khə.thɨ.		*!		*	
√ b. .khət.			*		*

There are other English words which end with a single C. Consider (58).

(58)		English	Korean
	a)	smog	simokɨ
	b)	lead	litɨ
	c)	league	likɨ

The final voiced consonants in (58) are pronounced as unreleased in the source

language. However, they are released in their equivalent forms in Korean. Recall that voiceless sounds in the same environment are pronounced as unreleased in their equivalent forms (53) at least for younger speakers. Why are similar sounds in the same environment realised differently? I would like to suggest that this is due to the tendency to keep distinct sounds apart: If both voiceless sounds and voiced sounds are borrowed as unreleased, the distinction between these sounds will be neutralized in the borrowed forms. In order to prevent it, the spelling of the words in the source language affects the pronunciation of loanwords in such a way that voiced sounds in English are realised as released in the word-final position. The representation of 'smoke' at the perceptual level is given in (59) and the relevant tableau is given in (60).

(59) 'smoke' at the perceptual level

s m o k
| / \
Af Ao Am

(60)

candidates	coda cond.	$Parse^{Am}$	$Fill^{nuc}$	$*Ins^{Am}$	NoCoda
✓ a. .si.mo.ki.			**		
b. .si.mok.		*!	*		*

Finally, let us discuss about words with an [r] sound. Consider (61).

(61)

English	Korean	
a. ring	riŋ	
b. mini car	mini ka	
c. park	phakhi	ʔphak
d. card	khati	*kat
e. cart	khathi	*kat
f. fork	phokhi	*phok

No native Korean words begin with [r] sound. However, this constraint is not maintained for non Sino-Korean loanwords: [r] can appear word-initially as we see in (61a). I argue that the constraint $*_{\omega}$[[liquid].... applies to native words only.

(62)

	candidates	coda cond.	$*_{\omega}$[liquid... <native> .	Parse^{Seg}	Fill^{nuc}	NoCoda
√	a. .riŋ.					*
	b. .<r>iŋ.			*!		*

Since [riŋ] is a recent loanword, it does not violate $*_{\omega}$[liquid and thus, the best output among the candidates as we see in (62). Furthermore, [r] never appears as a coda both in Korean native words and in loanwords. When a word with a coda [r] is borrowed into Korean, it is not pronounced as in (61b). The constraint tableau (63) produces the correct output. In (63), Parse^{F} is a collective form of saying 'Parse a labial segment, etc. (but not retroflex)' and Parse^{R} means 'Parse a retroflex segment'.

(63)

	candidates	coda cond.	Parse^{F}	Fill^{nuc}	*Ins^{Am}	Parse^{R}
√	a. .kha.<r>					*
	b. .kha.ri.			*!		

When a consonant follows [r], it is always pronounced as an onset. I suggest that this is due to rule (38). The final consonant in the word final cluster is adopted as released by rule (38) and thus will be syllabified as an onset.

(64)

	candidates	coda cond.	Parse^{Am}	Parse^{F}	Fill^{nuc}	Parse^{R}
√	a. .kha<r>.thi.				*	*
	b. .kha.ri.thi.				**!	

Among the candidates, [khathi] violates $Fill^{nuc}$ once whereas [kharithi] violates it twice. Therefore, [khathi] is selected for the output.

6. Conclusion

In this paper, I have investigated English loanwords in Korean. Following Silverman (1992), I have split the phonological levels of loanwords into two, the perceptual level and the operative level and examined what happens in each level. In addition, I have shown how aperture positions (Steriade 1991) play a role in loanword phonology.

Particularly, I have argued that there is some motivation for representing nasals as a consonant with AoAmax. I have also argued that the rankings of phonotactic constraints for loanwords are different from those of the native words contra to Yip (1993).

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